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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/563,047

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EXAMINER

XU, XIAOYUN

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/563,047	Applicant(s) BEAUDET ET AL.	
	Examiner ROBERT XU	Art Unit 4112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/15/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Summary

1. This is the initial Office action based on the 10/563,047 application filed on December 30, 2005.
2. Claims 1-27 are pending and have been fully considered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 8-11 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by FRANKS [US Patent No. 4,359,641] as evidenced by PUSELJIC [IEEE Transaction of Nuclear Science, 1990, Vol. 37(2), page 139-143].

In regard to Claims 1 and 3, FRANKS teaches a multicomponent scintillation medium that comprises a scintillation fluorescent Coumarin dye, Coumarin 540 (see Col. 6, line 19-26, Table 1). FRANKS does not specifically teach the value of the Stokes shift of Coumarin 540. However, the Stokes shift is an inherent property of Coumarin 540. PUSELJIC teaches that Coumarin 540 has a Stokes Shift of 125 nm (see Table 2).

In regard to Claims 9 and 11, FRANKS teaches a method of detecting and measuring radiation (see Col. 6, line 40-45). The method comprises the steps of :

providing a scintillations medium which contains a first scintillator material,
Coumarin 540 (see col. 6, line 41-45).

contacting the scintillation medium with an radionuclide analyte (see col. 6, lines
40-45); and

detecting any scintillation caused in the medium (see Figure 1).

FRANKS does not teach the value of Stokes shift of Coumarin 540. However, the
Stokes shift is an inherent property of Coumarin 540. PUSELJIC teaches that Coumarin
540 has a Stokes Shift of 125 nm (see Table 2).

In regard to Claims 2 and 10, FRANKS teaches that Coumarin 540 with a
pseudo-cumene as a solvent has a fluorescent emission of 485-525 nm (see Table 1).

In regard to Claims 4, 14 and 15, FRANKS teaches that the scintillation medium
further includes a second scintillator, BiBuQ. FRANKS further teaches that the role of
BiBuQ in this system is to increase energy transfer efficiency from the pseudo-cumene
to the Coumarin 540-A (see Col. 6, lines 19-21).

In regard to Claims 8 and 13, FRANKS teaches that the medium comprises
pseudo-cumene as a solvent having Coumarin 540 dissolved therein (see Col. 3, lines
56-58).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set
forth in section 102 of this title, if the differences between the subject matter sought to be patented and
the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 4112

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over FRANKS [US Patent No. 4,359,641] in view of BIRKS [British Journal of Applied Physics, 1963, Vol. 14, pages 141-143].

In regard to Claim 5, FRANKS teaches using a second scintillator material, BiBuQ, to increase energy transfer efficiency from the solvent to Coumarin (see Col. 6, lines 19-21). FRANKS does not teach using PPO or DPA as a secondary scintillator material. However, PPO and DPA are known scintillator materials. For example, BIRKS teaches using PPO and DPA as scintillator material (see abstract). Simple substitution of one known element for another to obtain predictable results is obvious according to recent Supreme Court ruling. [see *KSR International Co. v. Teleflex Inc.*, 550 U.S. , 82 USPQ2d 1385, 1395-97 (2007)] (see MPEP 2143). Because BiBuQ, PPO and DPA are known scintillator materials, therefore, simple substitution of one known element (BiBuQ) for another (PPO or DPA) to obtain predictable results (to increase energy transfer efficiency from the solvent to Coumarin as taught by FRANKS) is obvious to one of ordinary skill in the art at the time of the invention.

Art Unit: 4112

8. Claims 6, 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over FRANKS [US Patent No. 4,359,641] in view of COSTA [US Patent No. 4,692,266].

In regard to Claims 6 and 7, FRANKS includes BiBuQ as second scintillator material. FRANKS does not teach using solid polymer to hold Coumarin dye. The use of solid polymers having Coumarin dye incorporated therein is well known in the art. For example, COSTA teaches using solid polymer to hold Coumarin dyes (see Col. 6, lines 44-57). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the solid polymer taught by COSTA to hold Coumarin and BiBuQ dyes of FRANKS with reasonable expectation that this would make the scintillator dye easier to use.

9. Claims 16-18 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over FRANKS [US Patent No. 4,359,641] in view of COSTA [US Patent No. 4,692,266] and as further evidenced by PUSELJIC [IEEE Transaction of Nuclear Science, 1990, Vol. 37(2), page 139-143].

In regard to Claims 16 and 18, as has been discussed in Claims 6, 7 and 12 above, combined teaching of FRANKS and COSTA teaches solid state scintillator which comprises a fluorescent Coumarin dye. FRANKS does not teach the value of Stokes shift of Coumarin 540. However, the Stokes shift is an inherent property of Coumarin 540. PUSELJIC teaches that Coumarin 540 has a Stokes Shift of 125 nm (see Table 2).

In regard to Claim 17, FRANKS teaches that Coumarin 540 with a pseudo-cumene as a solvent has a fluorescent emission of 485-525 nm (see Table 1).

In regard to Claims 20 and 21, FRANKS teaches that the scintillation medium further includes a second scintillator, BiBuQ. FRANKS further teaches that the role of BiBuQ in this system is to increase energy transfer efficiency from the pseudo-cumene to the Coumarin 540-A (see Col. 6, lines 19-21).

In regard to Claim 22, COSTA teaches that the polymeric material bonds the scintillator particles into a coherent but porous bead (structure) (see Col. 3, lines 31-43).

In regard to Claim 23, COSTA teaches that the polymeric material structure is sufficiently porous that can hold at least 50% volume of liquid (see Col. 3, line lines 31-43).

In regard to Claim 24, COSTA teaches applying the scintillator composition coating to a surface of a sampling tray in a Packard Tri-Carb Liquid Scintillation Counter (see Col. 7, line 56-62). The sampling tray in Tri-Carb Liquid Scintillation Counter is known in the art to be configured to retain liquid samples.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over FRANKS [US Patent No. 4,359,641] in view of COSTA [US Patent No. 4,692,266] and evidenced by PUSELJIC [IEEE Transaction of Nuclear Science, 1990, Vol. 37(2), page 139-143] as applied to Claim 16-18 and 20-24 above, and further in view of HARRAH [4,594,179].

In regard to Claim 19, FRANKS teaches using Coumarin 540 as Coumarin dye. FRANKS does not teach using Coumarin 153 or Coumarin 152 as Coumarin dye. However, Coumarin 153 and Coumarin 152 are known Coumarin dyes with similar

Art Unit: 4112

emission wavelength and Stokes shifts. For example, HARRAH teaches Coumarin 153 is a scintillator with emission wavelength of about 484 nm and Stokes shift of about 135 nm (see Col. 7, lines 61-68). Simple substitution of one known element for another to obtain predictable results is obvious according to recent Supreme Court ruling. [see *KSR International Co. v. Teleflex Inc.*, 550 U.S. , 82 USPQ2d 1385, 1395-97 (2007)]. Because Coumarin 540 and Coumarin 153 are known scintillators with similar emission wavelengths and Stokes shifts, therefore, simple substitution of one known element (Coumarin 540) for another (Coumarin 135) to obtain predictable results (to convert radiation into fluorescent emission) is obvious to one of ordinary skill in the art at the time of the invention.

11. Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over FRANKS [US Patent No. 4,359,641] in view of BIRKS [British Journal of Applied Physics, 1963, Vol. 14, pages 141-143] and as further evidenced by PUSELJIC [IEEE Transaction of Nuclear Science, 1990, Vol. 37(2), page 139-143].

In regard to Claims 25 and 27, as has been discussed in respect to Claim 5 above, combined teaching of FRANKS and BIRKS teaches a liquid scintillation cocktail comprising Coumarin dye as first scintillator material and PPO or DPA as second scintillator material. FRANKS further teaches that the medium comprises pseudo-cumene as a solvent having Coumarin 540 dissolved therein (see Col. 3, lines 56-58). FRANKS does not teach the value of Stokes shift of Coumarin 540. However, the

Art Unit: 4112

Stokes shift is an inherent property of Coumarin 540. PUSELJIC teaches that Coumarin 540 has a Stokes Shift of 125 nm (see Table 2).

In regard to Claim 26, FRANKS teaches that Coumarin 540 with a pseudo-cumene as a solvent has a fluorescent emission of 485-525 nm (see Table 1).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. GU [Journal of Physics D: Applied Physics, 1999, Vol. 32, pages 2287-2289] teaches Coumarin 540 dye is introduced into ordered mesoporous silica by thermal diffusion (see abstract).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT XU whose telephone number is (571)270-5560. The examiner can normally be reached on Mon-Thur 7:30am-5:00pm, Fri 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571)272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 4112

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RX

/Brian J. Sines/

Primary Examiner, Art Unit 1797